05-01-00

A

sed on Form PTO-1082

ATTY. DOCKET NO.: M1717-18

COMMISSIONER OF PATENTS AND TRADEMARKS
ington, D.C. 20231
PATENT APPLICATION

EXPRESS MAIL LABEL NO. EL512714714US

MAIL DATE: _____

BY: _____
Margaret L. Goldstein

37 CFR 1.53(b) UTILITY PATENT APPLICATION TRANSMITTAL

Inventor(s): **Takeshi HIGUCHI**

Title: **Mechanism for Preventing Propagation of Driving Motor Noise and Vibration on a Tape Deck, and Tape Deck Having the Same**

Enclosed are:

[X] Specification (19 pages), including Abstract and 14 claims.

[X] 5 sheets of formal drawing containing 8 Figs.

[X] Declaration/Power of Attorney

[ ] This application is filed pursuant to 37 CFR §1.53(b). The Declaration will be filed pursuant to 37 CFR §1.63.

[X] Assignment and PTO-1595 Cover Sheet

[X] Information Disclosure Statement, PTO-1449 and 3 prior art references

[X] Preliminary Amendment

[X] Certified copy of Priority Document(s) for 35 USC 119 priority claim: Japan Pat. Appls. Nos. 11-003540 filed May 24, 1999 and 11-007647 filed October 7, 1999 .

The filing fee has been calculated as shown below:

	(Col. 1)	(Col.2)
FOR:	NO. FILED	NO. EXTRA *
BASIC FEE		
TOTAL CLAIMS	14 - 20 =	* 0
INDEP CLAIMS	3 - 3 =	* 0
[ ] MULTIPLE DEPENDENT CLAIM PRESENTED [ ] LATE FILING OF DECLARATION [X] ASSIGNMENT RECORDATION FEE		

* If the difference in Col. 1 is less than zero, enter "0" in Col. 2

SMALL ENTITY			OTHER THAN SMALL ENTITY	
RATE	FEE	OR	RATE	FEE
	$ 345	OR		$ 690
X 9 =	$	OR	X 18 =	$
X 39 =	$	OR	X 78 =	$
+ 130 = + 65 = + 40 =	$ $ $	OR	+ 260 = + 130 = + 40 =	$ $ $ 40
TOTAL	$	OR	TOTAL	$ 730

[ ] **The filing fee will be paid with our Response to Missing Parts of Application.**

[X] Please charge our Deposit Account No. 13-4550 in the amount of $ 730. . A duplicate copy of this sheet is enclosed.

[ ] A check in the amount of $_____ to cover the filing fee is enclosed.

[X] The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 13-4550 :

[X] Any additional fees required under 37 CFR 1.16 and 1.17.

Respectfully submitted,

Dated: 4/28/2000

George J. Brandt, Jr., Reg. No. 22,021
MORRISON LAW FIRM
145 North Fifth Avenue
Mt. Vernon, New York 10550
(914) 667-6755

W:\USERS\PEGGY\WPDATA\M1717-18.NPT

M1717-18

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Takeshi Higuchi
Serial No.	:	
Filed	:	Concurrently
For	:	MECHANISM FOR PREVENTING PROPAGATION OF DRIVING MOTOR NOISE AND VIBRATION ON A TAPE DECK, AND TAPE DECK HAVING SAME
Examiner	:	
Art Unit	:	

PRELIMINARY AMENDMENT

Hon. Assistant Commissioner for Patents
Washington, D.C. 20231
Sir:

Upon the according of a filing date herein, please amend the above-identified U.S. patent application as follows:

IN THE SPECIFICATION:

Page 4, line 13, change "wounded" to --wound--

Page 5, line 8, change "wounded" to --wound--

Page 6, line 13, change "is a perspective" to --is an exploded perspective--

Page 8, line 9, change "vises" to --screw fasteners--

" line 19, change "vises" to --screw fasteners--

Page 9, line 12, change "its internal diameter" to --a yoke hub passage--

Page 9, line 24, change "vises 34" to --screw fasteners 34--

Page 10, line 19, change "vises 34" to --screw fasteners 34--

IN THE CLAIMS:

Claim 4, line 5, change "wounded" to --wound--

Claim 9, line 12, change "wounded" to --wound--

REMARKS

This amendment is submitted to correct obvious grammatical and inapt wording errors in the specification and claims. No issue of new matter is raised be these corrections.

An early action on the merits is solicited.

Respectfully submitted,

George J. Brandt, Jr.
Registration No. 22,021
Attorney for Applicants

Morrison Law Firm
142 North Columbus Ave.
Mount Vernon, New York 10553
(914) 667-6755

MECHANISM FOR PREVENTING PROPAGATION OF DRIVING MOTOR NOISE AND VIBRATION ON A TAPE DECK, AND TAPE DECK HAVING THE SAME

BACKGROUND OF THE INVENTION

This invention relates generally to a mechanism for suppressing capstan driving motor noise and vibration on a videotape deck. Particularly, the invention relates to an art for preventing switching noise, caused by a switching control (e.g., a pulse width modulation (PWM) control) of a direct driving motor current in which a motor shaft is directly coupled to a capstan axis, from affecting images.

Conventionally, as to a capstan driving motor for a videotape deck, a method of full-wave or half-wave current linear driving is generally adopted. However, in order to achieve power-saving, high resistance to voltage, speed-up and suppression of heating, rather than this kind of the driving motor, it has been known to use a direct driving motor an output shaft of which can be directly connected to a capstan axis, and which is controlled by PWM method. As disclosed in a publication of unexamined Japanese Utility Model Application No. 59-117284, said direct driving motor controlled by PWM method is structured by a rotatable rotor provided with a 9 ring-shaped magnet, and a stator core facing to the magnet of said rotor and having a driving coil. Although this shows a brushless motor facing to a surface of the magnet, this structure can also be

applied to a brushless motor facing to a periphery of the magnet.

However, the above-mentioned PWM direct driving motor gives the driving coil higher voltage than the motor of the linear driving method does, and intermits (perform switching to) its current, as shown in FIG. 7, so that harmonics elements generate in a rising edge and a falling edge of the rectangular current. The harmonics elements become large switching noise, and the current containing the noise is induced on the stator core. In this state, since the motor is mounted on a deck chassis as an electrically conducting material in a conducting state, the current containing the noise is propagated to the deck chassis, and then, it is propagated through the deck chassis to the cylinder drum having a head, then further propagated to a video circuit and an audio circuit. Thus, the switching noise, which also contains frequency elements of a video band and a sound band, causes video screen noise (jitter) or audio noise. That is, the PWM direct driving motor gives the high frequency noise to the head amplifier and the like, which makes an unbearable state for watching and listening.

SUMMARY OF THE INVENTION

This invention is made to solve the above-mentioned problems. The first object of the present invention is to provide a mechanism for avoiding propagation of driving motor noise and vibration on a tape deck, which, using a direct driving motor controlled by PWM method for driving a capstan, prevents switching

noise of said motor from propagating to a cylinder head drum, a video circuit and an audio circuit, thereby suppressing the video screen noise and audio noise.

Further, when the direct driving motor controlled by PWM method is mounted on the deck chassis by using an insulating material such as resin in order to suppress said noise, the vibration of the motor may be propagated to the deck chassis, which causes vibration resonant sound, or increases screen jitter. The second object of the present invention is to provide a mechanism for preventing propagation of driving motor noise and vibration on a tape deck, which can resolve the problem caused by said vibration.

In order to achieve the above-mentioned objects, according to one aspect of the present invention, a mechanism for preventing propagation of driving motor noise on a tape deck comprises a deck chassis, a pinch roller and a capstan axis for conveying a tape, a motor which is mounted on said deck chassis for driving said capstan axis, and a cylinder drum which is mounted on said deck chassis and provided with a head for magnetic-recording and playing for the tape: wherein said motor is a direct driving motor in which a motor shaft is directly coupled to the capstan axis, and which is controlled by switching; and, wherein said motor is electrically insulated from said deck chassis.

In the above-mentioned constitution, when the direct driving motor is controlled by switching, current of comparatively high voltage is intermitted, so that switching noise containing

harmonics elements generates in the stator core of said motor. However, the motor and deck chassis are electrically insulated from each other, which prevents the switching noise from propagating to the deck chassis, and further avoids it from propagating to the cylinder drum, a video circuit and an audio circuit. Therefore, this constitution makes it possible to suppress video screen noise and audio noise.

In the above-mentioned constitution, the direct driving motor is mounted on the deck chassis through an insulator.

Further, in the above-mentioned constitution, said direct driving motor comprises a rotational axis as a capstan axis, a rotor which is mounted on said rotational axis, a stator core which is wounded by a coil being supplied PWM control current and faces to said rotor, and a bearing holder which holds said stator core and supports said rotational axis, and said direct driving motor is mounted through said bearing holder on the deck chassis, wherein said bearing holder is made of an insulating material. If resin is used as the bearing holder, for example, this constitution prevents the switching noise from propagating to the deck chassis in a comparatively simple structure.

In the above-mentioned constitution, said cylinder drum can be mounted on the deck chassis through an insulator.

According to another aspect of the present invention, a mechanism for preventing propagation of driving motor noise on a tape deck comprising a deck chassis, a pinch roller and a capstan axis

for conveying a tape, a motor which is mounted on said deck chassis for driving said capstan axis, and a cylinder drum which is mounted on said deck chassis and provided with a head for magnetic-recording and playing for the tape: wherein said motor is a direct driving motor in which a motor shaft is directly coupled to the capstan axis, and which is controlled by switching; and, wherein said motor comprises a rotational axis as a capstan axis, a rotor which is mounted in said rotational axis, a stator core which is wounded by a coil being supplied switching control current and faces to said rotor, a bearing holder which is made of an insulating material for holding said stator core and supporting said rotational axis, and a motor PCB (printed circuit board) which is supported by said bearing holder and on which circuit elements for controlling the motor are mounted, and wherein said motor is secured on the deck chassis through the bearing holder; and, wherein said motor PCB is held in close to where the bearing holder is mounted on the deck chassis, and supported by a supporting member in an electrically insulating state at a distance from where the motor PCB is held.

In the above-mentioned constitution, the direct driving motor controlled by a switching control is mounted on the deck chassis by using the bearing holder made of an insulating material such as resin. Although vibration caused by a decrease in mechanical securing strength of said motor in an activation thereof may propagate to the deck chassis, the motor PCB is held by the bearing holder, and besides, supported by the supporting member in

the electrically insulating state from the deck chassis. Accordingly, this constitution prevents generation of vibration resonant sound and increase of screen jitter.

In the above-mentioned constitution, the supporting member can be composed of a boss made of resin which is provided extending toward the motor PCB on the deck chassis. Further, the supporting member can be an extending part of an insulating holder for holding members mounted on the deck chassis. Furthermore, the supporting member can be composed of a projection formed on the deck chassis, and an insulating material intervened between said projection and the motor PCB.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing a constitution of a deck chassis of a videotape deck according to a first embodiment of the present invention.

FIG. 2(a) is a top view of a PWM driving motor of the present invention, and FIG. 2(b) is a front view in half section of said motor.

FIG. 3 is a side view showing the PWM motor integrated into the deck chassis.

FIG. 4 is a view explaining a constitution in which an electrical insulation is made between a stator core and the deck chassis or a head cylinder.

FIG. 5 is a view in half section of the videotape deck

according to a second embodiment of the present invention.

FIG. 6 is a view in half section of the videotape deck according to a modified embodiment of the second embodiment of the present invention.

FIG. 7 is a view showing harmonics elements generating in a rising edge and a falling edge of a rectangular current.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE PRESENT INVENTION

Now, a mechanism for preventing propagation of driving motor noise on a tape deck according to the first embodiment of the present invention will be explained with reference to the drawings. FIG. 1 shows a schematic constitution of a deck chassis in a videotape deck 1. In the figure, the videotape deck 1 is equipped with a rotatable head cylinder 3 (cylinder drum), a supply reel axis 5, a take-up reel axis 6 and tape loading pins 11 and 12 on the deck chassis 2. Said head cylinder 3 has a recording and playing head. Said supply reel axis 5 and take-up reel axis 6 engage with and support a tape reel in a cassette (not shown in the figure). Said tape loading pins 11 and 12 are mounted on sliders 9 and 10 which are slid through long-hole rails 7 and 8 in order for the tape supplied from the tape reel to be reeled on the head cylinder 3. Further, the deck chassis 2 has an opening 13 for a capstan, through which a capstan axis 15 is stuck out. A pinch roller assembly 17, which is supported by a supporting axis 16, is provided with a pinch roller 18. The

capstan axis 15 and pinch roller 18 pinch the tape therebetween so as to convey it.

Said head cylinder 3 includes a rotatable cylinder 3a which has the recording and playing head, and includes a fixed cylinder 3b which has a boss for supporting a pivot of the rotatable cylinder 3a. The rotatable cylinder 3a is driven to rotate by a driving motor 3c which is fixed on the top end of said pivot. The deck chassis 2 has tilted mounts 4a and 4b on which the fixed cylinder 3b is secured by vises. Accordingly, the head cylinder 3 is mounted in at a predetermined angle for helical scanning. A head circuit board is secured on the fixed axis of the fixed cylinder 3b. The fixed cylinder 3b, which is desired to be electrically grounded, is mounted on the deck chassis 2 in a conducting state.

The capstan axis 15 is composed of a rotational axis of a pulse width modulation (PWM) direct driving motor 20 (hereinafter referred to as PWM motor). Said motor 20 has a motor printed circuit board (PCB) 21, and a bearing holder 22 for holding the capstan axis 15. The motor 20 is secured on the deck chassis 2 by screwing vises 34 through small holes 24 of the deck chassis 2 into three screw holes 23 which are provided on the bearing holder 22 on a surface touching the deck chassis 2. Further, a video PCB (later described), a sound head, an eraser head and other members (not shown in the figure) are also mounted on the deck chassis 2.

FIGS. 2(a) and 2(b) show a constitution of the PWM motor 20. As shown in the figure, said motor 20 comprises stator cores 26,

a driving magnet 27, a rotor yoke 28 and a core holder 30. The stator core 26, around which a coil 25 being supplied the PWM control current is wound, is constituted by a laminated silicon steel sheet. The driving magnet 27 is composed of ferrite shaped like a ring, and the like, which constitutes a rotor toward a periphery of the core 26. The rotor yoke 28 is composed of iron and the like for supporting the magnet 27. The core holder 30 holds the stator core. The stator core 26 is unitedly fixed on the bearing holder 22 with the motor PCB 21 on which a driver IC (integrated circuit) 21a and the like for controlling said motor are mounted, through the core holder 30 by a tightening member 31. The rotor yoke 28 is secured on the capstan axis 15 in its internal diameter. The rotor yoke 28 is provided with a pulley 32 for looping a belt, and a yoke periphery rubber 29 magnetized for detecting rotational speed.

FIG. 3 shows the deck chassis 2 into which the PWM motor 20 is integrated. The motor 20 is integrated into the deck chassis 2 via the bearing holder 22, and the motor PCB 21 is held by the bearing holder 22. Accordingly, the motor 20 and the motor PCB 21 are mounted at a distance from the deck chassis 2. The deck chassis 2 is loaded into a frame at corners by columns 33.

In this state, the PWM motor 20 electrically insulates at least between the stator core 26 and the deck chassis 2 or head cylinder 3 by using an insulating material such as resin in the tightening parts of the bearing holder 22 or vises 34.

Next, referring to FIG. 4, the explanation is given to an

effect of the constitution in which the stator core 26, and the deck chassis 2 or head cylinder 3 are electrically insulated as mentioned above. FIG. 4 is a schematic view of the above-mentioned constitution. The deck chassis 2 makes a connection to a video PCB 40 through a head-amplifier shield 41 (GND). The video PCB 40 includes a video head-amplifier circuit 42 and an audio amplifier circuit 43 both of which have to be grounded, so that they are connected to the deck chassis 2 in an electrically conducting state. Dashed-line arrows in the figure show propagation paths of electronic current of switching noise which is induced by the stator core 26. It is possible to prevent the switching noise from propagating to the head cylinder 3, video head-amplifier circuit 42, or audio amplifier circuit 43 by cutting the path at a point A, B or C. However, it is less desirable to cut the path at the point B or C in the light of performance of each circuit located prior to them.

It is desirable to cut the path at the point A. Resin is employed as the bearing holder 22 in the present embodiment. Otherwise, rather than the resin bearing holder 22, it is also possible to employ resin as the vises 34, and have an insulating sheet intervene between the deck chassis 2 and bearing holder 22. This constitution, using the comparatively simple constitution, makes it possible to prevent the switching noise containing harmonics elements which generate in an activation of the PWM motor 20 from propagating to the deck chassis 2 and head cylinder 3, and further makes it possible to avoid it from propagating to the video head-

amplifier circuit 42 or audio amplifier circuit 43. Therefore, this resolves a problem of noise on a video screen, or a problem of audio noise.

Moreover, the constitution in which the video amplifier circuit is contained in the head cylinder 3 eliminates the need for grounding the head cylinder 3 on the deck chassis 2. Consequently, in such a case, there is no need to electrically insulate between the stator core 26 of the PWM motor 20 and the deck chassis 2, and what is required is to electrically insulate between the stator core 26 (i.e., deck chassis 2) and the head cylinder 3 by using a resin spacer as the tilted mounts 4a and 4b on which head cylinder 3 is mounted (in this case, the path is cut at the point C).

FIG. 5 shows a videotape deck according to the second embodiment of the present invention, and a half section of the deck chassis 2 into which a PWM direct driving motor 20 is integrated. As is the case with the first embodiment, if the PWM motor 20 is secured on the deck chassis 2 by using the insulating material such as resin for electrical insulation, its mechanical securing strength is prone to decrease, so that vibration generating in the activation of the PWM motor 20 may propagate to and resonate the deck chassis 2. Therefore, measures to deal with the vibration are added in the second embodiment. As shown in FIG. 5, the PWM motor 20 and motor PCB 21 are mounted through the bearing holder 22 to the deck chassis 2. Further, the motor PCB 21 is mechanically supported by a supporting member 51 at a part away from the bearing holder 22

mounted in the deck chassis 2 in a state of electrically insulating to the deck chassis 2. That is, the motor PCB 21 is held in close to where the bearing holder 22 is mounted on the deck chassis 2, and besides, it is also supported at the end part thereof at a distance from the bearing holder 22 in an electrically insulating state from the deck chassis 2.

In the present embodiment, the supporting member 51 is structured by a boss formed of a resin, which is mounted on the deck chassis 2 toward the motor PCB 21. The end of the boss is desired to be fixed or adhered to the motor PCB 21 at its contacting surface by using an adhesive. Thus, the constitution of supporting the motor PCB 21 as mentioned above can prevent the vibration generating in the activation of the PWM motor 20 from propagating to the deck chassis 2. Concerning the resin-formed boss, the member which is formed by outsert molding in the deck chassis 2 is also applicable. As to the position supported by the supporting member 51, it is more desirable to distance it from the supporting position by the bearing holder 22 of the motor PCB 21 as much as possible in order to increase an effect of suppressing the vibration. It is also applicable to engage one end of the motor PCB 21 with a recessed part of the resin-formed boss.

Said supporting member 51 can be an extended part of an insulating holder for holding gear-related components which each exerts their actions of the tape deck mounted on the deck chassis 2. Also, the supporting member 51 can be some shock absorbing

material or vibration absorbing material such as insulating rubber.

FIG. 6 shows a modified embodiment of the second embodiment. In this embodiment, the supporting member 51 is comprised of a projection 52 which is formed in the deck chassis 2 by drawing processing, and an insulating sheet material 53 (e.g., vinyl chloride) which is intervened between the projection 52 and motor PCB 21. The projection 52 and insulating sheet 53, and the insulating sheet 53 and motor PCB 21 are adhered to each other on their contacting surfaces. Instead of the insulating sheet 53, an insulating coating film can be formed on a contacting surface of the motor PCB 21 and projection 52. The constitutions of above-described second embodiment and the modified embodiment thereof suppress the vibration of the motor PCB 21 caused by the vibration generating in the activation of the PWM motor 20. Accordingly, this prevents the vibration from propagating to the deck chassis 2, which suppresses vibration resonant noise and avoids image jitter from generating.

Having described preferred embodiments of the invention with reference to the accompanying drawings, it is to be understood that the invention is not limited to those precise embodiments, and that various changes and modifications may be effected therein by one skilled in the art without departing from the scope or spirit of the invention as defined in the appended claims. For example, the above embodiment shows the constitution in which electrical insulation is given between the stator core of the PWM direct driving

motor and deck chassis, or between the stator core and cylinder drum, but the electrical insulation can be given to both of them. Further, an insulating structure other than the above-described constitution can also be applied.

What is claimed is:

1. A mechanism for preventing propagation of driving motor noise and vibration on a tape deck comprising a deck chassis, a pinch roller and a capstan axis for conveying a tape, a motor which is mounted on said deck chassis for driving said capstan axis, and a cylinder drum which is mounted on said deck chassis and provided with a head for magnetic-recording and playing on the tape:

wherein said motor is a direct driving motor in which a motor shaft is directly coupled to the capstan axis, and which is controlled by current switching; and,

wherein said motor is electrically insulated from said deck chassis.

2. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 1, wherein said direct driving motor is controlled by a pulse width modulation (PWM) control.

3. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 2, wherein said direct driving motor is mounted on said deck chassis through an insulating material.

4. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 2, wherein said direct driving motor comprises a rotational axis as a capstan axis, a rotor which is mounted on said rotational axis, a stator core which is wounded by a coil being supplied PWM control current and faces to

said rotor, and a bearing holder which holds said stator core and supports said rotational axis, and said direct driving motor is mounted through said bearing holder on the deck chassis:

wherein said bearing holder is made of an insulating material.

5. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 2, wherein said cylinder drum is mounted on said deck chassis through an insulator.

6. The tape deck which comprises the mechanism for controlling driving motor noise and vibration on a tape deck according to claim 2.

7. A mechanism for preventing propagation of driving motor noise and vibration on a tape deck comprising a direct driving motor controlled by current switching for driving a capstan axis, and a cylinder drum provided with a rotational cylinder having a head and a fixed cylinder:

wherein a stator core of said direct driving motor, said deck chassis and said cylinder drum are electrically insulated from each other.

8. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 7, wherein said direct driving motor is controlled by a pulse width modulation (PWM) control.

9. A mechanism for preventing propagation of driving motor noise and vibration on a tape deck comprising a deck chassis, a pinch

roller and a capstan axis for conveying a tape, a motor which is mounted on said deck chassis for driving said capstan axis, and a cylinder drum which is mounted on said deck chassis and provided with a head for magnetic-recording and playing on the tape:

wherein said motor is a direct driving motor in which a motor shaft is directly coupled to the capstan axis, and which is controlled by current switching;

wherein said motor comprises a rotational axis as a capstan axis, a rotor which is mounted in said rotational axis, a stator core which is wounded by a coil being supplied switching control current and faces to said rotor, a bearing holder which is made of an insulating material for holding said stator core and supporting said rotational axis, and a motor PCB (printed circuit board) which is supported by said bearing holder and on which circuit elements for controlling the motor are mounted, and wherein said motor is secured on the deck chassis through the bearing holder; and,

wherein said motor PCB is held in close to where the bearing holder is mounted on the deck chassis, and supported by a supporting member in an electrically insulating state at a distance from where the motor PCB is held.

10. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 9, wherein said direct driving motor is controlled by a pulse width modulation (PWM) control.

11. The mechanism for preventing propagation of driving motor

noise and vibration on a tape deck according to claim 10, wherein said supporting member is composed of a projection which is provided toward the motor PCB on said deck chassis and made of an insulating material.

12. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 10, wherein said supporting member is an extended part of an insulating holder for holding members which are mounted on said deck chassis.

13. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 10, wherein said supporting member is composed of a projection formed on the deck chassis, and an insulating material intervened between said projection and said motor PCB.

14. The tape deck which is provided with the mechanism which suppresses driving motor noise and vibration on a tape deck according to claim 10.

ABSTRACT

A direct driving motor for a videotape deck, in which a motor shaft is directly coupled to the capstan axis, and which is controlled by a PWM control, has a constitution in which a stator core and a deck chassis or a head cylinder are electrically insulated with each other. Also, the motor includes a bearing holder for holding a motor PCB (printed circuit board) one end of which is supported on the deck chassis in an insulating state. This constitution prevents current switching noise generating in the motor from propagating into the deck chassis, thereby suppressing video screen noise and audio noise, and also provides a measure for suppressing motor vibration.

FIG. 1

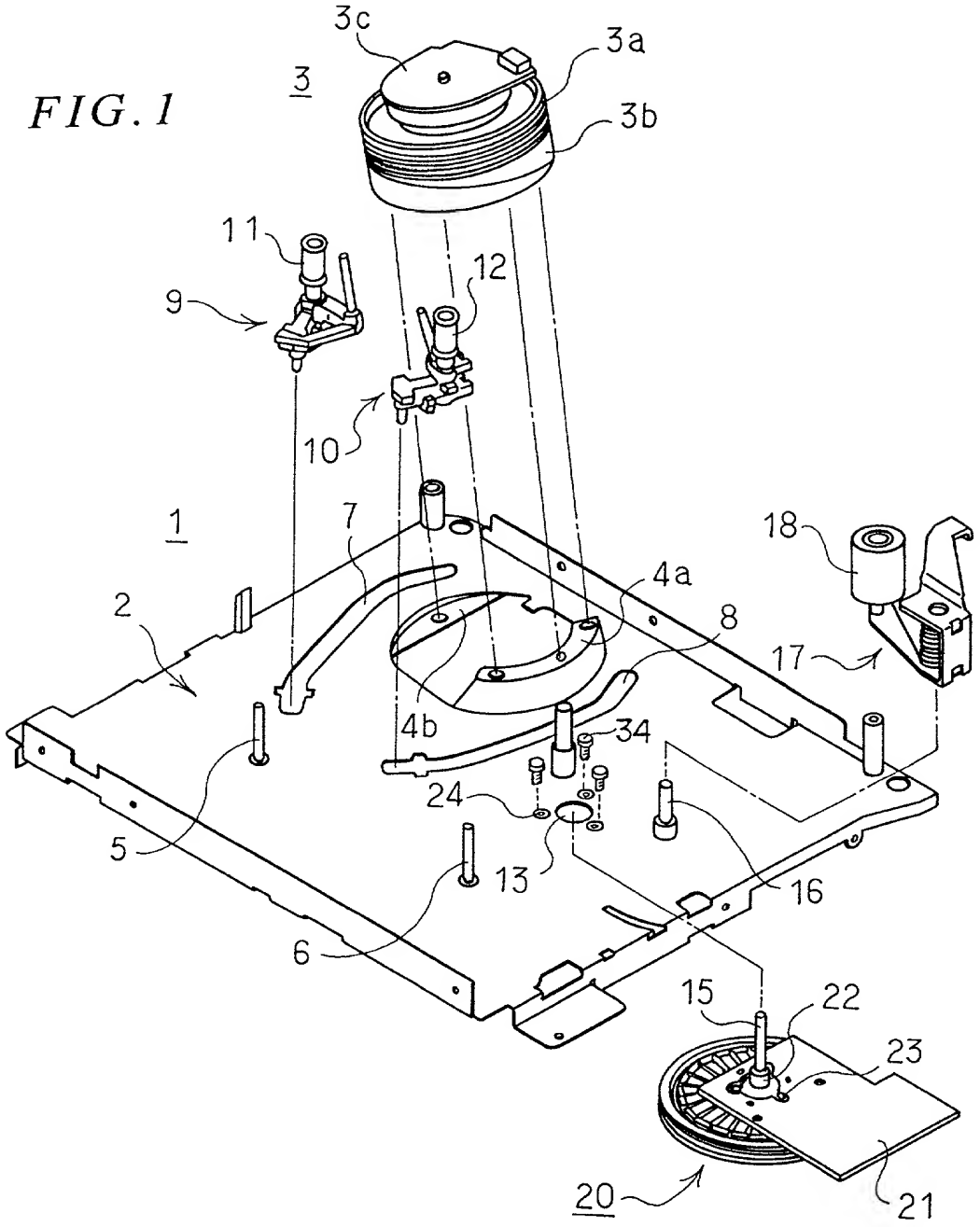


FIG. 2(a)

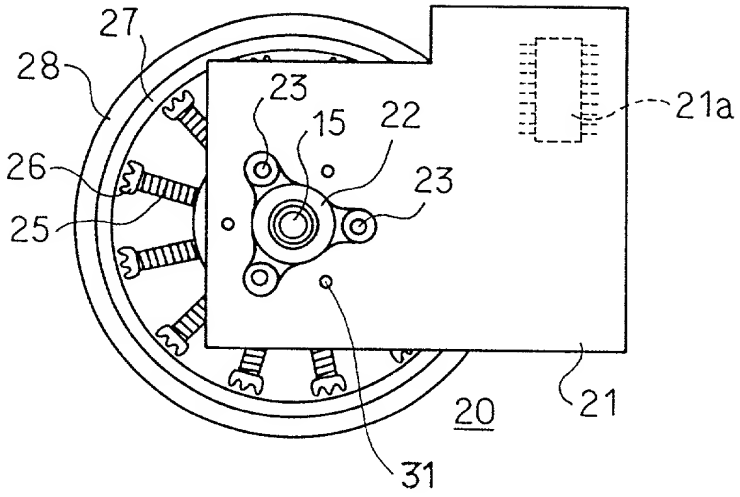

27
28
23
15
22
21a
26
23
25
20
21
31

FIG. 2(b)

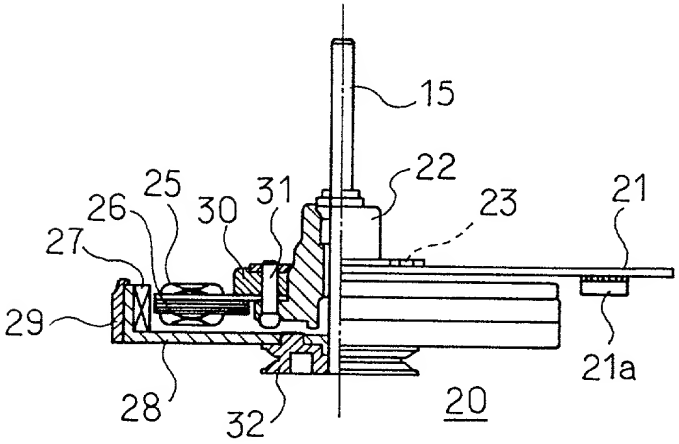

15
22
25
31
21
26
30
23
27
29
21a
28
32
20

FIG. 3

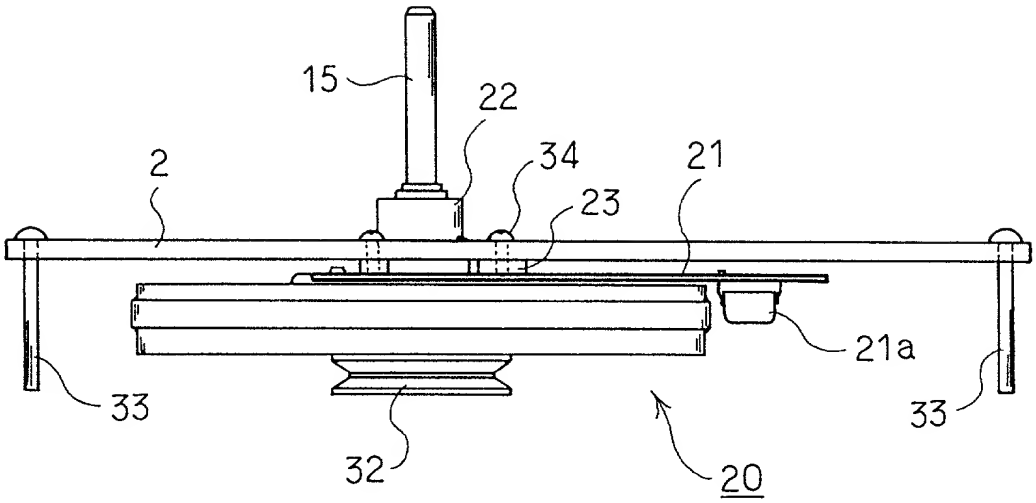

15
22
2
34
21
23
21a
33
33
32
20

FIG. 4

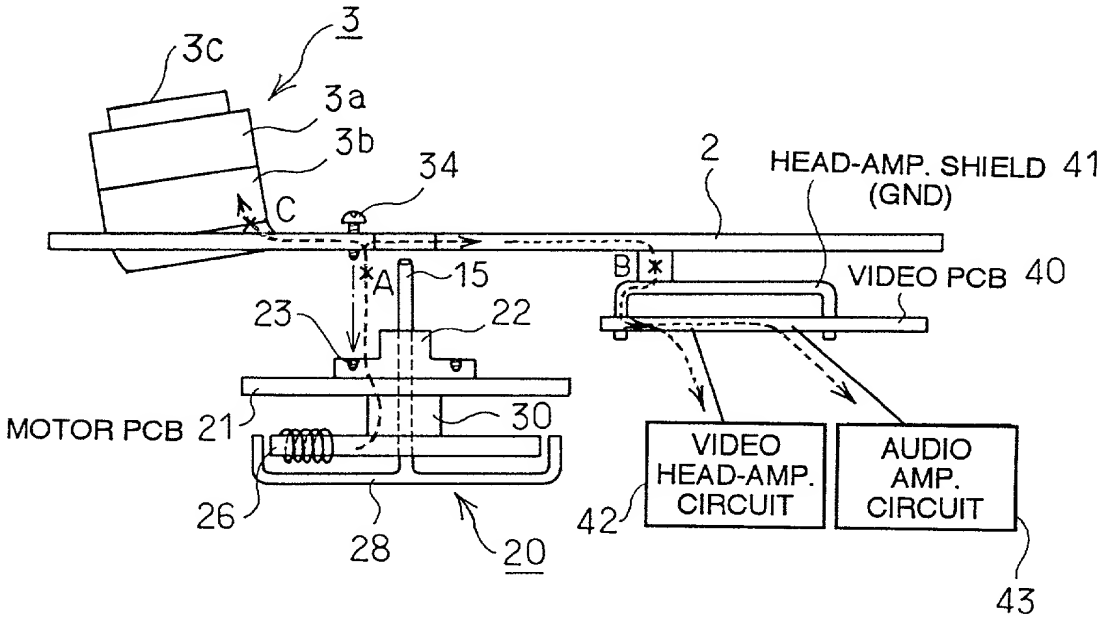

3
3c
3a
3b
34
C
2
HEAD-AMP. SHIELD (GND) 41
A
15
B
VIDEO PCB 40
23
22
MOTOR PCB 21
30
26
28
20
VIDEO HEAD-AMP. CIRCUIT
AUDIO AMP. CIRCUIT
42
43

FIG. 5

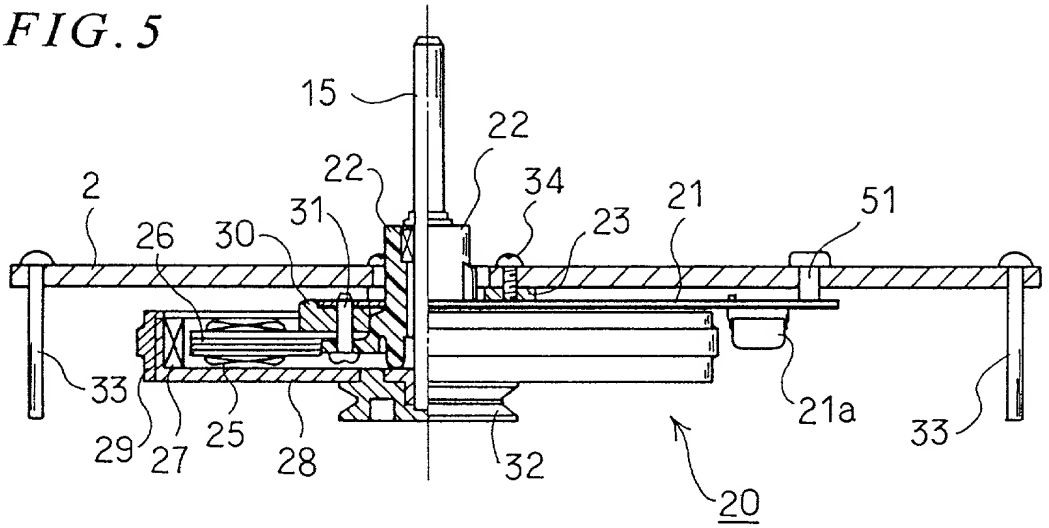

15
22
22
34
2
26
30
31
23
21
51
33
29
27
25
28
32
21a
33
20

FIG. 6

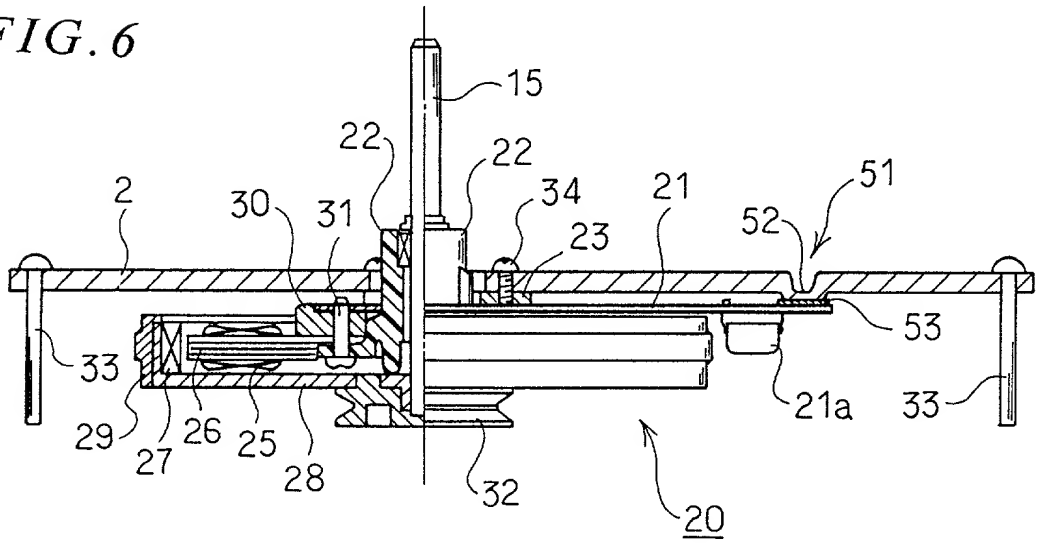
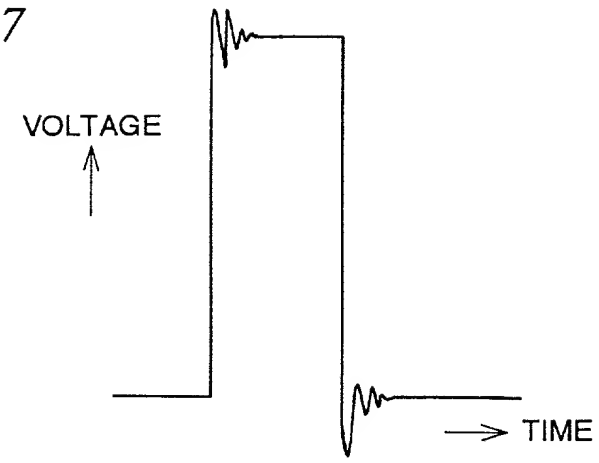

15
22
22
34
2
30
31
23
21
51
52
53
33
29
27
26
25
28
32
21a
33
20

FIG. 7



PTO/SB/106 (8-96)
Approved for use through 9/30/98. OMB 0651-0032
Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

M1717-18

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

MECHANISM FOR PREVENTING PROPAGATION OF DRIVING MOTOR NOISE AND VIBRATION ON A TAPE DECK, AND TAPE DECK HAVING THE SAME

上記発明の明細書（下記の欄でx印がついていない場合は、本書に添付）は、

the specification of which is attached hereto unless the following box is checked:

☐ __月__日に提出され、米国出願番号または特許協定条約国際出願番号を_____とし、
（該当する場合）_____ に訂正されました。

☐ was filed on _____
as United States Application Number or
PCT International Application Number
_____ and was amended on
_____ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第３７編第１条５６項に定義されるとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

PTO/SB/106 (8-96)
Approved for use through 9/30/98. OMB 0651-0032
Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Japanese Language Declaration
(日本語宣言書)

M1717-18

私は、米国法典第３５編１１９条(a)-(d)項又は３６５条(b)項に基き下記の、米国以外の国の少なくとも一ヵ国を指定している特許協力条約３６５(a)項に基ずく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)
外国での先行出願

(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	Priority Not Claimed 優先権主張なし
Utility Model 11-3540	JAPAN	24/05/1999	☐
Utility Model 11-7647	JAPAN	07/10/1999	☐

私は、第３５編米国法典１１９条(e)項に基いて下記の米国特許出願規定に記載された権利をここに主張いたします。

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.) (出願番号)	(Filing Date) (出願日)	(Application No.) (出願番号)	(Filing Date) (出願日)

私は、下記の米国法典第３５編１２０条に基いて下記の米国特許出願に記載された権利、又は米国を指定している特許協力条約３６５条(c)に基ずく権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第３５編１１２条第１項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先行米国出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法典第３７編１条５６項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

(Application No.) (出願番号)	(Filing Date) (出願日)	(Status: Patented, Pending, Abandoned) (現況：特許許可済、係属中、放棄済)

私は、私自身の知識に基ずいて本宣言書中で私が行なう表明が真実であり、かつ私の入手した情報と私の信じるところに基ずく表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第１８編第１００１条に基ずき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行なえば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

PTO/SB/106 (8-96)
Approved for use through 9/30/98. OMB 0651-0032
Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Japanese Language Declaration
(日本語宣言書)

M1717-18

委任状： 私は下記の発明者として、本出願に関する一切の手続きを米特許商標局に対して遂行する弁理士または代理人として、下記の者を指名いたします。（弁護士、または代理人の氏名及び登録番号を明記のこと）

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith *(list name and registration number)*

Thomas R. Morrison (Reg. No. 27,361); Roger S. Thompson (Reg. No. 29,594); George J. Brandt, Jr. (Reg. No. 22,021); Mark A. Catan (Reg. No. 38720); Charles M. Doyle (Reg. No. 39,175)

書類送付先

Send Correspondence to:

MORRISON LAW FIRM
145 North Fifth Avenue
Mount Vernon, NY 10550

直接電話連絡先： (名前及び電話番号)

Direct Telephone Calls to: *(name and telephone number)*

(914) 667-6755 Thomas R. Morrison, Esq.

単一または第一発明者名	Full name of sole or first inventor: Takeshi HIGUCHI
発明者の署名 日付	Inventor's signature: Takeshi Higuchi Date: 05/04/2000
住所	Residence: TSUYAMA-shi, OKAYAMA
国籍	Citizenship: JAPAN
私書箱	Post Office Address: c/o 7-1, Nakagaito 7-chome,
	Daito-shi, Osaka 574-0013, JAPAN
	Funai Electric Co., Ltd.

共同発明者についても同様に記載し、署名をすること

Supply similar information and signature for joint inventors.